

# CHANNEL SWITCHING APPARATUS OF DIGITAL TELEVISION AND METHOD THEREOF

## BACKGROUND OF THE INVENTION

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### 1. Field of the Invention

The present invention relates to a channel switching apparatus of a digital television and a method thereof, in particular to a channel switching apparatus of a digital television and a method thereof which is capable of making identification of a channel easier by providing OSD information related to a channel to be switched to a user when the user switches the channel of the digital television up/down.

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### 2. Description of the Prior Art

According to a start of a digital broadcasting, a plurality of forms of a reception apparatus for a digital television such as a direct view DTV receiving the digital broadcasting, a DTV set-top box etc. are developed, and are sold.

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In general, in order to select a pertinent channel among a plurality of broadcast signals received to the digital television, PAT/PMT information or PSIP information is required, in order to display the select channel on a screen, a received digital broadcast signal is switched into a digital channel and is displayed on the screen. A pretty amount of time is required in order to display the digital broadcast signal on the screen.

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An estimate required time for the display after the digital switching will now be described as below.

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First, about 300 ~ 400ms time are required for tuning and channel

demodulation of a received digital broadcast signal.

In order to select a channel of the digital television, about 400 ~ 500ms time for searching a PID (Packet ID) comprised in the digital broadcast signal with each mode are required.

5           There is two modes for the digital television. A PAT/PMT mode requires about 400ms time in order to search the PID, and a PSIP mode requires about 500ms time in order to search the PID.

10           In estimate time for outputting the received digital broadcast signal as a perfect picture after transmitting it to a video decoder, maximum 728ms are required because of 500ms time for receiving an I picture and VBV delay.

          After switching the digital broadcast signal into a digital channel, 100ms of coding time is more required besides the maximum 728ms in a whole time for displaying a perfect picture.

15           In the PAT/PMT mode, the whole required time can be described as below Equation 1.

[Equation 1]

$$400\text{ms}+500\text{ms}+500\text{ms}+730\text{ms}+100\text{ms}=2230\text{ms}$$

20           In the PSIP mode, the whole required time can be described as below Equation 2.

[Equation 2]

$$400\text{ms}+400\text{ms}+500\text{ms}+730\text{ms}+100\text{ms}=2130\text{ms}$$

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In order to display the channel selected among the broadcast signals received to the digital television, about 2230ms time are required in the PAT/PMT mode, and about 2130ms time are required in the PSIP mode.

As described above, in the digital television, about 2 or 3 seconds are required in order to display the select channel on a screen. It may cause unpleasantness and discomfort to a user by requiring lots of time to select a request channel because each channel can display a received picture after displaying a black picture for 2 or 3 seconds. The above-mentioned problem is decreased according to development of a hardware technology, however instant channel switching does not improved, accordingly it is still discomfort for the user.

In addition, in order to select the pertinent channel among the digital broadcast signals in the digital television, the PAT information, PMT information and PSIP information are required.

## SUMMARY OF THE INVENTION

The object of the present invention is to provide a channel switching apparatus of a digital television and a method thereof which is capable of making an identification of a select channel easier by displaying a preset channel icon through an OSD before displaying the select channel on a screen in channel up/down of the digital television.

In order to achieve the above-mentioned abject, the channel switching apparatus of the digital television in accordance with the present invention comprises a signal processing unit for receiving a broadcast signal, performing a digital signal processing and outputting it, a CPU for searching a pertinent icon by

accessing a storing unit storing a channel icon corresponding to a channel of the digital broadcast signal outputted from the signal processing unit, an icon display unit for displaying the channel icon searched from the CPU on a screen, and the storing unit for storing each designated channel icon corresponding to each received broadcast channel.

The channel switching method of the digital television in accordance with the present invention comprises an inputting process for inputting a up/down key of a channel, a searching process for searching the channel selected by the up/down key of the channel, searching process for searching a channel icon corresponding to the searched channel, a displaying process for displaying the channel icon corresponding to the searched channel on the screen for the receiving the broadcast signal.

#### BRIEF DESCRIPTION OF THE DRAWING

FIG.1 is a construction profile illustrating a channel switching apparatus of a digital television in accordance with the present invention.

FIG.2 is a flow chart illustrating a channel switching apparatus of a digital television in accordance with the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A channel switching apparatus of a digital television and a method thereof in accordance with the present invention will now be described with reference to accompanying drawings.

FIG.1 is a construction profile illustrating a channel switching apparatus of a digital television in accordance with the present invention. It comprises a signal processing unit 100 for receiving a broadcast signal, performing a digital signal processing and outputting it, a CPU 200 for detecting a pertinent icon by  
5 accessing a storing unit 400 storing a channel icon corresponding to a channel of the digital broadcast signal outputted from the signal processing unit 100, an icon display unit 300 for displaying the channel icon outputted from the CPU 200 on a screen, and the storing unit 400 for storing each designated channel icon corresponding to each received broadcast channel.

10 The signal processing unit 100 comprises a digital signal processor unit 110 for processing the received broadcast signal into a digital signal and outputting it, and an analog signal processor unit 120 for processing the received broadcast signal into an analog signal.

15 The storing unit 400 stores program data, and sets a diagram or a character representing a broadcasting station in the each received broadcast signal as a channel icon corresponding to the channel, it comprises a main memory unit 410 for storing the channel icon which is set by using a certain diagram or character in accordance with the received broadcast signal by the user and corresponds to the channel as a lookup table format, and an auxiliary storage  
20 unit 420 for storing data for operating a program.

The operation of the apparatus will now be described in more detail with reference to accompanying FIG.2.

First, when a power is applied, the CPU 200 is inputted program data of a whole system from the main memory unit 410, and judges whether the channel  
25 up/down key of the digital television is inputted. The data for operating the

program of the main memory unit 410 is inputted from the auxiliary storage unit 420.

When the channel up/down key is inputted S1, the CPU searches the pertinent channel S2, receives a broadcast signal corresponding to the searched  
5 channel from the signal processing unit 100, and searches an icon of the pertinent channel by comparing the icon corresponding to the channel with an icon of a channel stored on the main memory unit 410 S3.

The channel icon corresponding to the channel is displayed on a screen after passing the icon display unit 300 S4, and it is judged whether the other  
10 channel up/down key is inputted S5.

When the up/down key of the other channel is not inputted, the CPU 200 judges whether processing of the video signal of the channel corresponding to the signal outputted from the digital signal processor unit 110 and analog signal processor unit 120 is finished, when it is finished, the broadcast signal of the  
15 channel is displayed on the screen S7, when the processing of the video signal is not finished, the channel icon corresponding to the searched channel is displayed and it is judged whether the up/down key of the other channel is inputted, when it is not inputted, the above-mentioned process is performed repeatedly.

Meanwhile, when a up/down key of a new channel is inputted before the  
20 video signal is finished, the CPU 200 searches the newly inputted channel S2, is inputted a broadcast signal corresponding to the searched channel, searches a channel icon corresponding to the channel S4, displays it on the screen S4, and judges whether another up/down channel is inputted. And, the above-mentioned process is performed repeatedly.

25 The channel icon stored in the CPU 200 is data about the diagram and

character representing the each broadcast station in the received broadcast signal, and the user stores the received broadcast signal as a certain diagram and character in accordance with the broadcast station with the lookup table format.

The channel icon can be set so as to be matched directly with the broadcast station while the user searches the stored icon among the data related to the plurality of the icons stored in the CPU 200, when the broadcast station transmits the data related to the icon representing the broadcast station, the CPU 200 detects it and stores it in the main memory unit 410, accordingly the channel icon can be used in channel switching.

In addition, when a viewer does not want to display the channel icon on the screen, it is possible to set so as to get the icon not displayed by installing an additional select key.

As described above, the present invention is capable of displaying the set channel icon by the OSD before displaying the broadcast signal corresponding to the select channel in channel up/down of the digital television by the user by using the channel icon set in advance about the each channel of the digital television. The present invention is capable of making the channel identification easier by displaying the channel picture stored in the OSD for the time required in order to display the user select channel broadcast in the screen, preventing black phenomenon of the screen, accordingly the present invention can maximize the satisfaction of the user.